PREMEDICATION IN ANAESTHESIA

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DEFINITION

Administration of various drugs before **induction** of anaesthesia.

HISTORY :

- **1869 –Bernard gave morphine as premedicant in dogs and showed, it reduce the dose of chlorofom required.**
- **1911 – at anaesthetic section of Royal Society of Medicine, use of Atropine, Morphine and Scopolamine before induction was first described**

AIMS OF PREMEDICATION :

- To allay pre-operative fear and anxiety.
- To produce amnesia and analgesia.
- To reduce secretion from salivary glands and respiratory tract.
- To potentiate anaesthetic drugs
- To depress unwanted reflex vagal activities
- To reduce the pH and volume of gastric contents and risk associated with regurgitation and aspiration.
- To attenuate sympathetic reflex activities and stress associated with anaesthesia and surgery.
- To reduce incidence of post operative nausea and vomiting.

Qualities of an ideal premedication drug

- Devoid of any side effects
- Minimal depression of respiration and cardiovascular function.
- Simple and pleasant to take.
- Should act over reasonable period of time.
- Should be effective in all patients.

1. OPIOIDS :

- **As a premedicant produce analgesia and sedation** *Mechanisms of Action :*
- Interact with specific receptors in the CNS and in peripheral tissue namely μ, κ, δ.

μ	κ	δ
Supraspinal & spinal analgesia	Supraspinal & spinal analgesia	Supraspinal & spinal analgesia
Respiratory depression	Respiratory depression	Respiratory depression
Constipation	Dysphorhia	Physical dependence
Urinary retention	Sedation	Urinary retention
	Miosis	Constipation
	Diuresis	

ACTIONS :

CNS :

- Analgesia, sedation, euphoria
- Depression of respiratory centre.
- Depression of vasomotor centre.
- Depression of cough reflex.
- Hypothermia
- Stimulate vagal centre (x)

CVS :

- Vasodilatation
- Bradycardia
- Decrease cardiac work.

GIT :

- Constipation (خشکی)
- Delayed gastric emptying.

Respiratory system :

- Respiratory depression.
- Broncho constriction

Genitourinary :

- Urinary retention (احتباس ادراری)
- Diuresis(پرادراری)
- Antidiuresis(ضد ادرار زیاد)

CONTRA INDICATIONS

- **Respiratory insufficiency.**
- **Head injury**
- **Hypotensive states.**
- **Undiagnosed acute abdomen.**
- **Elderly patient**
- **Hypothyroidism**

Commonly used OPIOIDS

Drug	Dose	Advantage	Disadvatage
Morphine	0.1 – 0.2 mg/kg IM 10 – 15 mg IM in adults	Sedation Anxiolysis Analgesia	Depression of cough reflex, miosis, addictive properties
Pethidine	1.5 – 2 mg/kg IM Child. 50 – 100 mg IM Adults	Less spasmodic Less histamine release Less depression of cough reflex Less newborn respiratory depression Effective antishivering	Less potent Antimuscarinic effects High incidence of nausea vomiting Convulsant.
Fentanyl	2 – 5 µ g/kg IV	Hemodynamics stability Absence of histamin release Suppression of stress response More potent, short duration	Muscle rigidity Bradycardia

2. BENZODIAZEPINES

- As a premedicant – sedation, anxiolysis, anticonvulsant, muscle relaxation, anterograde amnesia.

Mechanism of Action :

- Facilitating the action of GABA on post synaptic membrane → increase chloride conductance → hypopolarization.

Advantages of Benzodiazepines :

1. High therapeutic index
2. Less respiratory depression
3. Low abuse potential
4. Lack microsomal induction
5. Specific antidote – Flumazenil.

Commonly used **BENZODIAZEPINES**

Drug	Dose	Advantage	Disadvatage
Diazepam	0.25-0.5mg/kg orally 5-10mg iv	Potent sedative	Pain on injection Long acting
Midazolam	0.03 – 0.05 mg/kg IV 0.5 mg/kg oral.	Short acting More potent	
Lorazepam	25 – 50 mg oral 1 – 4 mg IV / IM.	Age and liver disease does not affect metabolism	Long acting.

Common Features :

- **Potentiate** the effect of **non-depolarizing** muscle relaxant.
- Depressed respiration when administered with **opioids**.
- Scopolamine potentiate their **amenstic** activity.
- Midazolam is helpful in preventing emergence delirium after ketamine anaesthesia

3. ANTICHOLINERGIC

As a premedicant –

- Reduced secretions.
- Vagolytic

Mechanism of Action :

- Block post ganglionic parasympathetic nerve endings through muscarinic receptors i.e. M_1, M_2, M_3 receptors.

COMPARATIVE EFFECTS OF ANTICHOLINERGICS

Drug	اثر ضد بزاقی	CAS	Sedation & Amnesia
Atropine	1	low	1
Scopolamine	3	medium	10
Glycopyrolate	2	-	0

ACTIONS :

CNS –

- Overall CNS stimulation by atropin
- CNS depression by hyosin.

CVS –

- Facilitate AV conduction – increase PR interval.
- Tachycardia and stimulation of vasomotor centre – increase blood pressure.
- Histamine release and direct vasodilator effect – decrease blood pressure.

SMOOTH MUSCLES :

- All smooth muscles are relax
- In GIT – constipation
- Bronchodilatation
- Urinary retention

GLANDS :

- Decrease secretion from all glands.
- Decrease the volume of gastric content.

INCREASE BODY TEMPERATURE

EYE –

- Mydriasis ,
- cycloplegia.

SIDE EFFECT :

- Dry mouth, difficulty in swallowing
- Fever
- Difficulty in micturation.
- Photophobia, blurring of vision.
- Excitement
- Psychotic behavior.

COMMONLY USED DRUGS :

- Atropine – 0.02 mg/kg IV/IM

  Disadvantage – CNS excitation

  Tachycardia

  Fever.

4. Drugs used to alter gastric fluid volume & pH :

As a premedicant – reduced the likelihood of aspiration of gastric contents.

Risk factors : associated with aspiration.

- Abdominal distention
- Diabetics
- Emergency surgery.
- Raised intracranial tension.
- Hiatal hernia.
- Pregnancy
- Drugs
  - Antimuscarinics opioids.

A. Antiacids

a) Soluble : Na bicarbonate

b) Non-soluble – Mg hydroxide, Al hydroxide, Calcium carbonate.

Actions :

- Neutralises gastric acid immediately.
- Doest not decrease gastric volume.
- Can increase gastric volume – when used with opioids.
- Better to administer with prokinetics.
- In soluable antacids. May cause significant pulmonary damage after aspiration.

B. H_2 antagonists :

- Ranitidine – 50 – 200 mg orally
  50 – 100 mg IV
- Cimetidine 150 – 300 mg orally/parenterally
- Famotidine. 20 mg orally BD

Actions :

- Block nucturnal and fasting acid production.
- Partially block meal induced acid serection.
- Ranitidin most commonly used have less side effect and long duration of action.
- Cost effective.

C. Proton Pump Inhibitor :

- Inhibit H^+ K^+ ATPase enzyme present in parital cells
- Minimal side effect
- Cost is concern
- Drugs -
  - Omeprazole – 20 – 40 mg OD
  - Lansoprazol – 15 – 30 mg OD

D. Prokinetics :

- Acts by increasing cholinergic activity in enteric neurons.
  - Agonist at 5HT4 – promotes release of ACH.
  - D2 antagonism – potentiate cholinergic stimulation anti emetic and anti nausea.

- Well tolerated
- If given rapidly – abdominal cramps.
- Drowsiness, restlessness, agitation.

Drugs :

- Metoclopramide – 0.1 – 0.3 mg /kg IV
- Domperidon – 0.3 – 0.6 mg /kg orally
- Domperidon produce less CNS side effects.

5. Antiemetics-

• Nausea and vomiting are single most common factor delaying recovry of patients.

• Factors associated with increased incidence of nausea and vomiting

•Sex – female

•Type of surgery- gynaecological, laparoscopic, ENT, ophthalmic sx

• Prolonged duration of anaesthesia

• Metabollic disturbances

• Raised ICT

• Previous history

• Psychogenic stimuli

DRUGS-

1. **5HT3 Antagonist-**
   - Blocks 5HT3 receptors on intestinal vagal afferent as well as CNS
   - Most effective
   - Exhibit few side effects
   - Cost is major concern

   Ondansetron- 4-8mg iv

   0.1mg/kg upto 4 mg in children

   Dolasetron- 25-50mg oral

   12.5mg IV

2. **Butyrophenones-**
   - Action is through central dopaminergic blockade.
   - Potent sedative with an anti anxiety action.
   - Extrapyramidal effects α_1 anti adrenergic action, anticholinergic effects are major side effects.
   - Drugs :
     - Droperidol 2.5 mg to 10 mg IM or IV.

3. **Phenothiazine**
   - **Action is through antidopaminergic and anticholinergic properties.**
   - **Powerful hypnotic with minimal respiratory depression.**
   - **Cost Effective.**
   - **Drugs :**
     - **Promethazine, perphenazine, promazine.**

6. Centrally acting ~2 agonists –

As a premedicant –

- Sedation and anxiolysis
- Reduced requirements of anaesthetic and analgesic drugs.
- Maintain perioperative hemodynamic stability.
- Reduced agitation in children after Sevoflurene anaesthesia
- Reduced PONV.
- Obtund stress response

Drugs :

- Clonidine – 3 – 5 μg /kg orally – 60 – 90 min. before surgery.
- Residual post-op sedation is major concern.

PREMEDICATION IN ASSOCIATED DISORDERS :

1. Hypertensive patients :

- Objective of premedication –
  - Optimum sedation and anxiolysis
  - To preserve perioperative hemodynamics stability
  - To obtund stress response to intubation and surgery.
- Antihypertensive drugs to be continued except Losertan & Diuretics
- α2 agonist, opioids, esmolol are given to preserve perioperative hemodynamic stability.
- Hypokalemia - common in patients on diuretics
  - to be correct preoperatively.

2. Ischemic Heart Disease Patients :

- Objective of premedication – optimum sedation and anxiolysis without undesirable ventilatory and circulatory depression.
- Anticholinergic mainly atropin to be avoided.
- One useful combination is morphine 10 – 15 mg. IM + hyoscine 0.4 – 0.6 mg IM.
- Aspirin to be discontinued 7 days before surgery.

3. Rheumatic Heart Disease Patients :

- Premedication should decrease anxiety and associated adverse circulatory response
- Patients are more susceptible to depressant effect of sedative drugs
- Prophylactic antibiotics should be considered
- Antcholinergics better avoided
- Patients on anticoagulant therapy- warfarin should be substituted by heparin 3-5 days prior sx

4. Patients with COPD and Asthma :

- Bronchodilators , steroids should be continued
- Prophylactic antibiotics in COPD patients
- Opioids to be used cautiously – respiratory depression, bronchoconstriction
- Anticholinergics should be individualized – dries secretion difficult to remove
- NSAIDS should be avoided

5. Diabetes mellitus:

- Objectives-

  Avoid hypoglycemia , excessive hyperglycemia , ketoacidosis

  Blood glucose should be maintained 120-180m

- OHD to be avoided on day of surgery
- Premedication to avoid aspiration and nausea vomiting

PREMEDICATION IN OBSTRETIC ANAESTHESIA

- Patients are at risk of aspiration due to –
  - Progesterone delays gastric emptying
  - Gravid uterus
  - Drugs esp opioids
- Opioids and BZD may cause adverse effect on neonate
- Amnesia – woman may not be able to remember her birthing experiences

PREMEDICATION IN OUTPATIENTS SURGERIES

- Aims and objectives are similar, care to be taken not to prolong recovery of patient
- Short acting benzodiazepines medazolam commanly used
- Short acting opioids such as fentanyl, sufentanyl are preffered
- Alpha 2 agonist can be used
- NSAID on fixed dosing schedule may reduce intra op opioid requirement
- Premedication to avoid aspiration and nausea , vomiting
    - 5HT 3 antagonist are most effective
    - Droperidol less than 10 umg/kg cost effective
    - Phenothiazines to be avoided

PREMEDICATION IN PAEDIATRIC PATIENTS

- ***Premedication in infants-***
    - Infant less than 6 months don not require sedative premedication
    - Antisialogouges no longer required in neonate
    - Aim is to obtund vagal reflexes
- ***Premedication in children-***
    - Aims –
        - To get calm and comfortable child in operating room
        - To decrease secretions
        - To obtund vagal reflexes
        - To avoid post op. behavioral disturbances

- Considering fear for needles , routes other than im / iv prefered

1.Sedatives :

Midazolam- most commanly used

0.5-0.75mg/kg orally 20 mins prior

0.4-0.5mg/kg per rectally

2. Analgesics-

Diclofenac- 1.5mg/kg rectally

3. Opioids-

Pethidine-1-2mg/kg im

Morphine-o.1-o.2mg/kg im

4. Ketamine-

6mg/kg orally

3-5mg/kg im/iv

5. Anticholinergics-

Atropine- 0.02mg/kg im/iv

glycopyrrolate- 4-8ug/kg im/iv

6. Antiemetics-

Droperidol- 0.05-0.1mg/kg

Ondansetron- 0.1mg/kg

Promethazine- 0.5mg/kg


THANK YOU